Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (canceled)

2. (currently amended) The method of canceling communication system noise interference according to claim [1] 4 wherein steps b-d are repeated for each subchannel *n* used to transmit the *T* blocks of data.

3. (canceled)

4. (currently amended) A method of canceling communication system noise interference, the method comprising the steps of:

(a) receiving T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels;

(b) determining a set of subchannels, **k**(n), for the multichannel frequency domain equalizer (FEQ) for subchannel n;

(c) generating multichannel FEQ coefficients, **g**(n), for the n^{th} subchannel used to transmit the data; and

(d) performing multichannel (FEQ) for subchannel n using the generated multichannel FEQ coefficients;

wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data includes selecting subchannel *n*;

[The method of canceling communication system noise interference according to claim 3] wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data further includes selecting neighboring subchannels to subchannel *n*.

5. (currently amended) A method of canceling communication system noise interference, the method comprising the steps of:

(a) receiving T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels;

(b) determining a set of subchannels, **k**(n), for the multichannel frequency domain equalizer (FEQ) for subchannel n;

(c) generating multichannel FEQ coefficients, **g**(n), for the n^{th} subchannel used to transmit the data; and

(d) performing multichannel (FEQ) for subchannel n using the generated multichannel FEQ coefficients;

wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data includes selecting subchannel *n*;

[The method of canceling communication system noise interference according to claim 3] wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data further includes selecting subchannels where radio frequency interference is located.

6. (currently amended) A method of canceling communication system noise interference, the method comprising the steps of:

(a) receiving T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels;

(b) determining a set of subchannels, **k**(n), for the multichannel frequency domain equalizer (FEQ) for subchannel n;

(c) generating multichannel FEQ coefficients, **g**(n), for the n^{th} subchannel used to transmit the data; and

(d) performing multichannel (FEQ) for subchannel n using the generated multichannel FEQ coefficients;

wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data includes selecting subchannel *n*;

[The method of canceling communication system noise interference according to claim 3] wherein the step of determining a set of subchannels, **k**(*n*), for a subchannel *n* used to transmit the *T* blocks of data further includes selecting subchannels having predetermined noise characteristics.

7. (currently amended) A method of canceling communication system noise interference, the method comprising the steps of:

(a) receiving T blocks of data, **Y**(:, *t*), *t=1, ..., T*, comprising T blocks of data, **X**(:,*t*), *t=1, ..., T*, transmitted over predetermined subchannels;

(b) determining a set of subchannels, **k**(n), for the multichannel frequency domain equalizer (FEQ) for subchannel n;

(c) generating multichannel FEQ coefficients, **g**(n), for the n^{th} subchannel used to transmit the data; and

(d) performing multichannel (FEQ) for subchannel n using the generated multichannel FEQ coefficients;

[The method of canceling communication system noise interference according to claim 1] wherein the step of generating multichannel FEQ coefficients, **g**(n), for subchannel *n*, comprises solving the equation $\mathbf{g}(n) = \mathbf{Y}(n)^{-1}s(n)$, where $\mathbf{Y}(n)^{-1}$ is the pseudoinverse of a matrix of received data for subchannels **k**(*n*), and **x**(*n*) is a vector of transmitted data for subchannel *n*.

8. (canceled)

9. (canceled)

10. (canceled)

11. (canceled)

12. (canceled)

13. (canceled)

14. (currently amended) A system for canceling communication system noise interference, the system comprising:

a multichannel frequency domain equalizer configured to receive T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels, wherein the multichannel frequency domain equalizer is operational generate multichannel frequency domain equalization (FEQ) coefficients, $\mathbf{g}(n)$, associated with the n^{th} subchannel used to transmit the data, and to perform multichannel FEQ for the n^{th} subchannel using the generated multichannel FEQ coefficients, and further wherein the FEQ coefficients are associated with a set of subchannels, $\mathbf{k}(n)$, for the n^{th} subchannel used to transmit the T blocks of data, [The system according to claim 13] wherein the FEQ is operational to increase a subchannel signal-to-noise ratio beyond that achievable using a single channel FEQ.

15. (currently amended) A system for canceling communication system noise interference, the system comprising:

a multichannel frequency domain equalizer configured to receive T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels, wherein the multichannel frequency domain equalizer is operational generate multichannel frequency domain equalization (FEQ) coefficients, $\mathbf{g}(n)$, associated with the n^{th} subchannel used to transmit the data, and to perform multichannel FEQ for the n^{th} subchannel using the generated multichannel FEQ coefficients, and further wherein the FEQ coefficients are associated with a set of subchannels, $\mathbf{k}(n)$, for the n^{th} subchannel used to transmit the T blocks of data, [The system according to claim 13] wherein the FEQ is operational to cancel

correlated subchannel noise caused by deterministic noise spreading associated with a plurality of subchannels.

16. (currently amended) A system for canceling communication system noise interference, the system comprising:

a multichannel frequency domain equalizer configured to receive T blocks of data, $\mathbf{Y}(:, t)$, $t=1, \ldots, T$, comprising T blocks of data, $\mathbf{X}(:,t)$, $t=1, \ldots, T$, transmitted over predetermined subchannels, wherein the multichannel frequency domain equalizer is operational generate multichannel frequency domain equalization (FEQ) coefficients, $\mathbf{g}(n)$, associated with the n^{th} subchannel used to transmit the data, and to perform multichannel FEQ for the n^{th} subchannel using the generated multichannel FEQ coefficients, and further wherein the FEQ coefficients are associated with a set of subchannels, $\mathbf{k}(n)$, for the n^{th} subchannel used to transmit the T blocks of data, [The system according to claim 13] wherein the FEQ is operational to increase achievable digital subscriber network data rate beyond that achievable using a single channel FEQ.